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NOTES ON, AND THE PRECISE GEOLOGICAL HORIZON OF SIPHONOTRETA SCOTICA, DAVIDSON.

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(Read March 3rd, 1887.)

At the Montreal Meeting of the American Association for the Advancement of Science in 1883, Mr. J. F. Whiteaves, Palæontologist, &c., to the Geological Survey of Canada, read a communication or paper before the Geological Section, in which there was recorded for the first time on this continent the occurrence of a beautifully fringed, or spinose brachiopod, which, from specimens sent him, Dr. Thos. Davidson, the eminent authority on the Brachiopoda, had recognized to be referable to a form which he himself had described as *Siphonotreta Scotica*. The specimens thus referred to de Verneuil's genus *Siphonotreta* had been collected by Mr. J. W. H. Watts, of the Ottawa Field-Naturalists' Club, and that gentleman had handed them to Mr. Whiteaves and subsequently presented them to the National Museum at Ottawa where they are now exhibited in the cases. The specimens in question had been obtained from blocks of impure limestone lying near Mr. Watts' residence at Cummings' Bridge, near Ottawa, and were said to have come out of a well sunk by the same gentleman on his property. There was but little doubt, both from the lithological aspect of the rock containing the specimens of *Siphonotreta* and other fossils found on this property, and from the *facies* of the included fauna, that the measures whence they came were referable to the Utica Formation. For some time, however, a certain amount of doubt was entertained by a number of palæontologists as to the precise geological position of the interesting form under consideration; but, from recent investigations made with the special object in view of clearing this point, the writer, in conjunction with Messrs. McConnell, Hayter and other members of the Ottawa Field-Naturalists' Club has made a number of excursions during which specimens of this beautiful shell were collected.

In order to ascertain definitely the true horizon of the *Siphonotreta* in question, it was necessary to find it *in situ*, and further to obtain from the same bed or beds in which it occurs as many species of fossils as possible, in other words, determine what were its contemporaries. It had been previously pointed out that the lowest measures of the Utica formation about Ottawa consisted in a series of impure bands of limestone, at times slightly dolomitic and interstratified with black brittle bituminous shales all abounding in fossils. (See Geological Report, Transactions Ottawa Field-Naturalists' Club, Vol. I. No. 4, p. 66; also Vol. II, p. 347). The close resemblance in lithological character between the specimens sent to Dr. Davidson by Mr. Whiteaves and the rocks constituting the lower portion of the Utica formation where it crops out along the right bank of the Rideau River, opposite the Rifle Range, near the rapids, was such as to warrant a careful search for *Siphonotreta* in that locality. After a somewhat careful search on the part of those members of the Club above mentioned, a goodly number of specimens of this interesting species were found at the rapids along with other forms to be mentioned later on.

The precise bed in which *Siphonotreta Scotica* occurs, is that band of impure bituminous limestone, black or dark brown in colour, which crosses the Rideau River at this locality and forms the rapids or slight fall, giving the peculiar orographic aspect to that portion of the river which it possesses and dividing the smooth flowing water above this point stretching on to near Hurdman's Bridge from the rapid running waters below.

The following is a section of the measures of the Utica formation exposed at the head of the rapids opposite the Rifle Range, and includes the zone of *Siphonotreta Scotica*. The middle and upper measures of the Utica have been denuded away, especially during glacial times, and the uppermost beds of the section are capped with Post-Tertiary deposits made up for the most part of debris of the 'till' and Saxicava sand and associated gravel formations with 'erratics' in abundance, the beds of clay having been washed away in latter times. The section is given in descending order:

CHARACTER OF BEDS, THE THICKNESS, &c.

These upper measures consist of very soft, brittle and friable bituminous shales holding <i>Triarthrus Becki</i> , Green and other fossils.	(Shales.) Thirty inches.
Band of hard compact impure limestone teeming with the remains of <i>Conularia Trentonensis</i> , Hall, and holding also <i>Zygospira Headi</i> , Bill, <i>Leptaena sericea</i> , Sow. <i>Orthis testudinaria</i> Dal. <i>Calymene senaria</i> , Con., &c., &c.	(Limestone) One inch.
Zone of <i>Siphonotreta Scotica</i> . Band of black impure bituminous limestones gradually passing into a series of calcareo-argillaceous shales, at other times compact and breaking with a conchoidal fracture, holding abundance of fossils. (See lists.)	(Limestone.) Zone of <i>Siphonotreta</i> . Varies from eight to twelve inches.
Black and brittle impure (calcareo-argillaceous) shales, bituminous and holding the remains of <i>Asaphus Canadensis</i> , Chapman, &c.	(Shales.)
Band of impure limestone.	(Limestone.)
Shales, very bituminous and brittle.	(Shales.)
Band of impure limestone.	(Limestone.)
Brownish-black beds of shales, very brittle and bituminous.	(Shales.)
Two bands of an irregular and unevenly bedded nodular limestone containing <i>Orthocera</i> and other fossils but poorly preserved; limestone dark and somewhat bituminous.	(Limestone.)

From the band of impure limestone holding *Siphonotreta* the following species of fossils have also been found intimately associated therewith:—

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| 1. <i>Batostoma erraticum</i> Ulrich. | 10. <i>Zygospira</i> (probably a new form). |
| 2. <i>Lingula curta</i> , Hall. | 11. <i>Conularia Trentonensis</i> , Hall. |
| 3. " <i>elongata</i> , Hall. | 12. <i>Asaphus Canadensis</i> , Chapman. |
| 4. " <i>quadrata</i> , Eichwald. | 13. " <i>platycephalus</i> , Stokes. |
| 5. <i>Leptaena sericea</i> , Sowerby. | <i>vel megistos</i> , Locke. |
| 6. <i>Strophomena alternata</i> , Conrad. | 14. <i>Calymene senaria</i> , Conrad. |
| 7. <i>Orthis testudinaria</i> , Dalman. | 15. <i>Beyrichia oculifera</i> , Hall. |
| 8. <i>Zygospira Headi</i> , Billings. | 16. <i>Lepiditella cylindrica</i> , Hall. |
| 9. " <i>modesta</i> , Say. | |

A mere glance at the fauna which thus characterizes the zone of *Siphonotreta Scotica* in America is sufficient to indicate that the measures whence they came belong to the Utica Formation, in the upper portion of the Cambro-Silurian or Ordovician System. A single hand specimen showed the following interesting association of species:—

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| 1. <i>Siphonotreta Scotica</i> , Dav. | 3. <i>Zygospira Headi</i> , Bill. |
| 2. <i>Leptaena sericea</i> , Sow. | 4. <i>Asaphus Canadensis</i> , Chap. |

From specimens obtained at the head of the Rifle Range Rapids along the Rideau River by the writer and from those of the National Museum collection kindly placed at the disposition of the writer by Mr. Whiteaves, the following notes have been gathered :—

Specimen No. 1.—Collected at the rapids along the Rideau River, opposite the Rifle Range, in Gloucester. Collector H.M.A., 1886.

This specimen agrees well with the beautiful and clear description given by Dr. Davidson in his "Supplement to the British Silurian Brachiopoda, 1882-1884, p. 217," and only slight variations such as might be merely local can be observed. The dimensions of the shell are as follows:—*Length*, twelve and a-half millimetres; *breadth*, eleven millimetres; *height*, measured at about one third the distance from the beak to the anterior extremity, two millimetres. Length of the longest spines, seen along the anterior margin, three millimetres.

Specimen No. 2.—Collected by Mr. J. W. H. Watts on his property, Cummings' Bridge P. O., Ont., near Ottawa City, 1883.

This specimen exhibits the spines all around the outer margin of the valve from near the beak on one side round the front margin and near the beak on the other side. These spines, the longest measured as yet, gave three and a half millimetres, or one and a half lines in length. In the centre of the umbonal region where the valve rises abruptly from the beak near the latter there is a clearly defined sinus or groove extending only a short distance anteriorly and dying out on the gently convex or arched valve. This feature is also present in the next.

Specimen No. 3.—Collected by Mr. J. W. H. Watts at the same locality as No. 2.

A very typical example of the species indeed, whose length is twelve and a-half millimetres (6 lines) and breadth ten and a half millimetres (5 lines). The height of the valve is two millimetres but the spines being partially or wholly imbedded in the matrix their length has not been ascertained exactly.

The three specimens above referred to, as mentioned before, agree well with Dr. Davidson's Scottish form *Siphonotreta Scotica*; nevertheless as it may possibly happen that the Canadian form exhibits the few points of variation constantly, the varietal designation of *Si-*

phonostreta Scotica var. *Canadensis* now proposed, may perhaps not be entirely deemed inappropriate. The spines in the Canadian specimens examined so far are exceedingly minute and numerous, narrowly cylindrical, pointed and smooth for the most part, and somewhat broad and thickened at the base. Even under a high power of a microscope the spines appear to be smooth, no anulations being visible, whilst irregularly distributed punctures at times appear to be present—these are perhaps due to the mode of fossilization. The number of spines round the outer margin of specimen No. 2. (*supra*) has been roughly estimated at over three hundred, forming only one of the many rows of “adpressed spines” ranging from beak to beak round the anterior front of the shell.

It may not be deemed out of place in this connection to give a list of the species of fossils associated with *S. Scotica*, Dav., and collected at Craighead, in Ayrshire, Scotland, chiefly by Mrs. R. Gray, a lady whose researches in and contributions to paleontology are well known. They are all referred to the Llandeilo formation, a series of measures underlying the Caradoc-Bala group, all members of the Cambro-Silurian or Ordovician System. The list of Brachiopoda has been compiled from Dr. Davidson’s “Supplement” (*loc. cit.*) and the Crustacea are taken from the admirable “Monograph of the Silurian fossils of the Girvan district, in Ayrshire,” by Dr. H. A. Nicholson and Mr. Robt. Etheridge, J.C., F.G.S.

The following is the list of species from Craighead in the Llandeilo formation from which *Siphonostreta Septica* was obtained, those common to Canada all italicised.

BRACHIOPODA.

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| 1. <i>Lingula quadrata</i> , Eichwald. | 12. <i>Orthis testudinaria</i> , Dalman. |
| 2. “ <i>Ramsayi</i> , Salter. | 13. “ <i>confinis</i> , Salter. |
| 3. <i>Discina perrugata</i> , McCoy. | 14. “ <i>biforata</i> , Schlotheim. |
| 4. <i>Acrotreta Nicholsoni</i> , Dav. | 15. “ <i>turgida</i> , McCoy. |
| 5. <i>Leptaena sericea</i> , Sow. | 16. <i>Strophomena rhomboidalis</i> , Wilckens. |
| 6. “ <i>tenuicincta</i> , McCoy. | 17. “ <i>Imbrex</i> , Pander, var. |
| 7. “ <i>Youngiana</i> , Dav. | 18. “ <i>expansa</i> , Sowerby. |
| 8. “ <i>Grayæ</i> , Dav. | 19. “ <i>retroflexa</i> , Salter. |
| 9. <i>Leptaena Etheridgei</i> , Dav. | 20. <i>Rhynchonella Balcluthiensis</i> , Dav. |
| 10. (?) <i>Orthis unguis</i> , Sow. | 21. “ <i>Peachii</i> , Dav. |
| 11. <i>Orthis Sowerbyiana</i> , Dav. | 22. “ <i>Scotica</i> , Dav. |

CRUSTACEA.

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| 1. Calymene Blumenbachii Brong. | 6. Illænus Bowmani, Salter. |
| 2. Bronteus sp. (large form). | 7. " Rosenbergi, Eichwald. |
| 3. Cheirurus gelasinus, Portlock. | 8. Lichas Hibernicus, Portlock. |
| 4. Ecerinurus punctatus, Brünlich. | |
| 5. Ecerinurus punctatus var. arenaceus,
Salter. | |

The association of *Siphonotreta Scotica*, Dav., has thus been given both as regards its Canadian and European contemporaries. There are no doubt a number of other forms occurring throughout the section at the Rapids, in Gloucester, not mentioned, which would swell the list considerably, but subsequent researches will help in ascertaining their precise affinities and lead to other forms being found.

There remains much work, however, to be done in ascertaining the internal characters of this pretty little spinose brachiopod which in Scotland and Canada used to flourish in the old Cambro-Silurian Seas.

Should any member of the Club find any specimen or specimens of *Siphonotreta Scotica* or of its Canadian variety which would throw additional light and show the muscular and other impressions of the interior of this shell belonging to the division of the Tretenterata, he or she would be conferring a favour to Science by contributing the same in the Club's Transactions or elsewhere.

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